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(Translation)

APPLICATION FOR PATENT

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TITLE OF INVENTION: APPARATUS AND METHOD FOR CONTROLLING  
A FOCUS POSITION FOR A DIGITAL STILL CAMER

Submitted herewith is/are an application identified above pursuant to Article 42 of the Patent  
Act.

This 7th day of October, 1997

To the Commissioner of  
the Korean Industrial Property Office

KOREAN INDUSTRIAL PROPERTY OFFICE

This is to certify that the following application annexed hereto is a true copy from the records of the Korean Industrial Property Office.

Application Number: Patent Application No. 1997-51339

Date of Application: October 7, 1997

Applicant(s): SAMSUNG AEROSPACE INDUSTRIES, LTD.

COMMISSIONER

## **[ABSTRACT]**

The present invention relates to a digital still camera for controlling a focus position and a method thereof. The invention comprises a switch means for inputting a user's selection to move a focus position; a display means for displaying an image of a subject and a focus position; a focus means for focusing by driving a lens which generates an image by collecting light; a photoelectric converting means for generating electric signals corresponding to the image generated by the lens; a memory for storing an image data; image signal processing means for generating image data by processing the electric signals generated from said photoelectric converting means, storing the generated image data in said memory means, and displaying the image data on said display means; and a focus control means for displaying a focus at a focus position according to the user's selection through said switch means, generating a focus value corresponding to the focus position by processing the image data stored in said memory means, and focusing by controlling the focus means according to the generated focus value. As described above, since a user can relocate a focus position to a desirable position of a subject, a user can take a picture having a certain position focused without changing the frame or composition of the picture.

## **[REPRESENTATIVE DRAWING]**

FIG. 1

**[SPECIFICATION]**

**[TITLE OF THE INVENTION]**

5 APPARATUS AND METHOD FOR CONTROLLING A FOCUS POSITION FOR  
A DIGITAL STILL CAMERA

**[BRIEF DESCRIPTION OF THE DRAWINGS]**

10 FIG. 1 is a block diagram of a digital still camera in accordance with a  
preferred embodiment of the present invention;

FIG. 2 is a flowchart showing the operation for controlling a focus  
position for a digital still camera in accordance with a preferred embodiment of  
the present invention.

**[DETAILED DESCRIPTION OF THE INVENTION]**

15 **[OBJECTIVE OF THE INVENTION]**

**[FIELD OF THE INVENTION AND DESCRIPTION OF THE RELATED ARD]**

The present invention relates to an apparatus and a method for  
controlling a focus position for a digital still camera, and more particularly, to an  
apparatus and method for controlling a focus position for a digital still camera,  
20 which allows a user to move a focus to a desirable position on a subject.

A conventional digital still camera is a device which uses an electronic  
sensor such as a charge coupled device (CCD), to capture an image; a digital  
camera processor (DCP) to convert analog image signals from the CCD into  
digital image signals; a storage device to store the digital image signals; and a  
25 liquid crystal display (LCD) to display the digital image signals.

When a user takes a photograph using a release button after a subject

is displayed on the LCD, data stored in a memory are compressed by software of hardware compressing circuit and stores in a flash memory card or recording media etc.

Image files, that is graphic files stored in a flash card or recording media etc. are played on a computer and is capable of randomly being handled as a general graphic file is edited.

Conventionally, an autofocus system of a digital camera utilizing image signals of DCP in focusing displays a mark on a focus position on an LCD, the mark is fixed at the center of the LCD.

Then, a user should locate a subject to be focused at the center of the LCD and take a photograph.

Therefore, even when the subject to be focused is not located at the center of the frame, the camera assumes that the center of the frame needs to be focused and has the real subject intended to be focused be out of focus..

#### **[SUMMARY OF THE INVENTION]**

It is an objective of the present invention to provide an apparatus and a method for controlling a focus position for a digital still camera. It is also an object of the present invention to provide an apparatus and a method for moving a focus position to a desirable position of a subject.

#### **[STRUCTURE AND OPERATION OF THE INVENTION]**

To achieve the objective, the invention comprises, a switch means for inputting a user's selection to move a focus position; a display means for displaying an image of a subject and a focus

position; a focus means for focusing by driving a lens which generates an image by collecting light;

    a photoelectric converting means for generating electric signals corresponding to the image generated by the lens;

5       a memory for storing an image data;

    image signal processing means for generating image data by processing the electric signals generated from said photoelectric converting means, storing the generated image data in said memory means, and displaying the image data on said display means; and

10       a focus control means for displaying a focus at a focus position according to the user's selection through said switch means, generating a focus value corresponding to the focus position by processing the image data stored in said memory means, and focusing by controlling the focus means according to the generated focus value.

15           Also, the switch means further comprises a shutter release button for inputting a user's selection to take a photograph and the focus control means further comprises a compression/restoration means for compressing the image data stored in the memory means when the shutter release button is operated and an image memory means for storing the image data compressed by the 20 compression/restoration means.

          To achieve the objective, the invention comprises the steps of,  
          storing an image data corresponding to a subject;  
          determining whether there is a user's selection for moving a focus position;

displaying a moved focus position if it is determined that there is a user's selection for moving a focus position in the step;

generating a focus value based on the image data corresponding on the moved focus position among the stored image data; and

5 focusing according to the generated focus value.

Also, the invention further comprises the steps of, after the step for focusing: determining when photographic function commences after said step for focusing; and compressing the stored image data and storing the compressed image data when photographic function commences.

10 Reference will now be made in detail to the preferred embodiment of the present invention, an example of which is illustrated in the accompanying drawings.

FIG. 1 is a block diagram of a digital still camera in accordance with a preferred embodiment of the present invention.

15 As shown in FIG. 1, a digital still camera comprises a lens/lens driving unit 10 generating an image by collecting light from the subject; a photoelectric converting unit(20) for generating electric signals corresponding to the image generated by the lens/lens driving unit(10); a switch unit(30) for moving a focus position and for starting photographing according to a user's selection; an LCD unit(40) for displaying the image; a frame memory unit(50) for storing image data; a flash memory card unit(60) for storing a compressed image data; an image signal processing unit(70) for generating image data by processing the electric signals generated from the photoelectric converting unit(20), for storing the image data in the frame memory unit(50), and for displaying the image data

on the LCD screen(40); a focus control unit(80) that moves a focus position according to the user's selection through the switch unit(30) and displays the relocated focus position on the LCD unit(50) by controlling the image signal processing unit(70) and generates a value of the focus position by processing the image data stored in the frame memory unit(30) corresponding to the relocated focus position and focuses the new subject by controlling the lens/lens driving unit(10) according to the value of the focus position and compresses the image data stored in the frame memory unit(50) when the user selects to photograph via the switch unit(30), and stores the compressed image data in the flash memory card unit(60) by the image signal processing unit(70).

Also, the switch unit(30) comprises a shutter release button (not shown) for taking a photograph.

FIG. 2 is a flowchart showing the operation for controlling a focus position for a digital still camera in accordance with a preferred embodiment of the present invention.

As shown in FIG. 2, a control method for a digital still camera comprises a step(S1) for storing the image data in the frame memory unit(50) and displaying the image data on the LCD unit(40); a step(S2) for determining whether there is a user's selection for moving a focus position; a step(S3) for displaying a moved focus position on the LCD unit(40) if it is determined that there is a user's selection for moving a focus position in the step(S2); a step(S4) for generating a focus value based on image data corresponding on the moved focus position among image data stored in the frame memory unit(50) in the step(S1); a step(S5) for operating a focusing process by

controlling the lens/lens driving unit(10) according to the generated focus value in the step(S4); a step(S6) for determining whether the shutter release button turns on; a step(S7) for taking a photograph if it is determined that the shutter release button turned on in the step S6, the step(S7) comprising a step for compressing image data stored in the frame memory unit(50) and a step for storing in the flash memory card unit(60).

Now, referring to the above components, the operation of the apparatus for controlling a focus position for a digital still camera in accordance with a preferred embodiment of the present invention will be explained.

First, when a user faces the lens/lens driving unit(10) of the digital still camera to a subject after the camera is turned on, the lens/lens driving unit(10) forms an image of the subject and the photoelectric converting unit(20) generates electric signals corresponding to the image formed by the lens/lens driving unit(10) and outputs the signals.

The image signal processing unit(70) receives the signals from the photoelectric converting unit(20) and generates image data corresponding to the signals and stores the image data in the frame memory unit 50 and transmits the image data to the LCD unit 40 to displays the image(S1).

The user views a picture in the LCD unit(40) and moves the focus position by using the switch unit(30) without changing the frame and composition of the picture to a non-center position of the LCD unit(40)(S2).

The focus control unit(80) controls the image signal processing unit(70) in order to display the moved focus position on the LCD unit 40 according to the user's input for moving the focus position(S3).

When the moving for the focus position is completed, the focus control unit(80) stores the moved focus position and calculates an address of the frame memory unit(50) corresponding to the moved focus position.

5 Next, the focus control unit(80) reads the image data stored in the calculated address of the frame memory(50) and generates a focus value(S4).

The focus control unit(80) focuses on an desirable position on a subject by controlling the lens/lens driving unit(10) according to the focus value calculated in the step(S4)(S5).

10 Accordingly, the person is focused corresponding to the focus position as displayed on the LCD unit(40).

Next, the shutter release button in the switch unit(30) is checked if it is turned on(S6) and if the shutter release button is turned on, the picture is taken(S7).

15 The picture is taken as follows: The focus control unit 80 compresses the image data stored in the frame memory unit 50 and the image signal processing unit 70 stores the compressed data in the flash memory card unit 60.

#### **[EFFECT OF THE INVENTION]**

20 As described above, since a user can relocate a focus position to a desirable position of a subject, a user can take a picture having a certain position focused without changing the frame or composition of the picture.

**[WHAT IS CLAIMED IS]**

**[CLAIM 1]**

A digital still camera for controlling a focus position, comprising:

a switch means for inputting a user's selection to move a focus position;

5 a display means for displaying an image of a subject and a focus position;

a focus means for focusing by driving a lens which generates an image by collecting light;

10 a photoelectric converting means for generating electric signals corresponding to the image generated by the lens;

a memory for storing an image data;

15 image signal processing means for generating image data by processing the electric signals generated from said photoelectric converting means, storing the generated image data in said memory means, and displaying the image data on said display means; and

a focus control means for displaying a focus at a focus position according to the user's selection through said switch means, generating a focus value corresponding to the focus position by processing the image data stored in said memory means, and focusing by controlling the focus means according 20 to the generated focus value.

**[CLAIM 2]**

The digital still camera of claim 1, wherein said focus control means further comprises a compression/restoration means for compressing the image data stored in said memory means.

**[CLAIM 3]**

The digital still camera of claim 1, further comprising an image memory means for storing the image data compressed by said focus control means.

**[CLAIM 4]**

5 A method for controlling a digital still camera, comprising the steps of:  
storing an image data corresponding to a subject;  
determining whether there is a user's selection for moving a focus position;  
displaying a moved focus position if it is determined that there is a 10 user's selection for moving a focus position in the step;  
generating a focus value based on the image data corresponding on the moved focus position among the stored image data; and  
focusing according to the generated focus value.

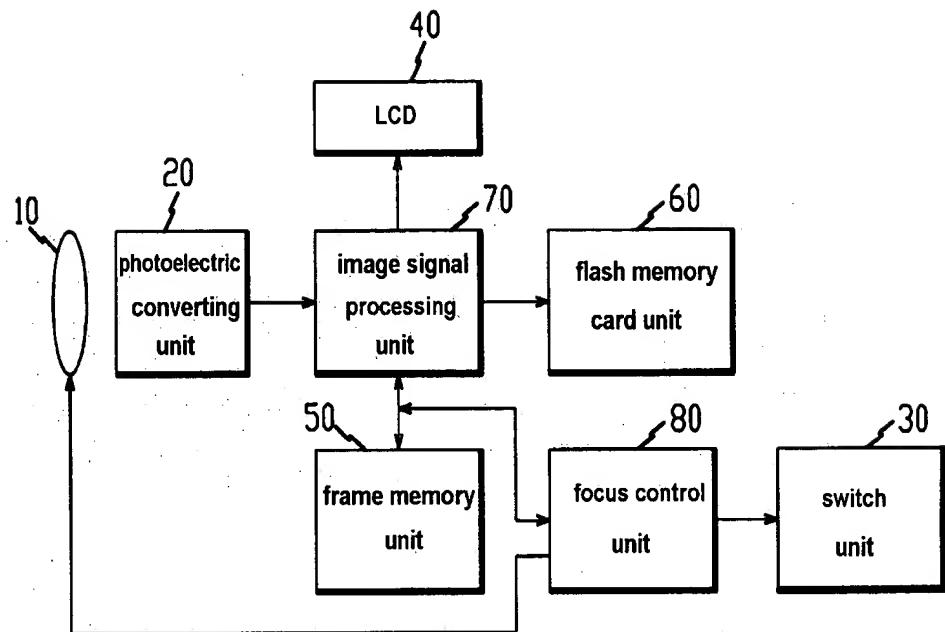
**[CLAIM 5]**

15 The method of claim 4, further comprising the steps of, after said step for focusing:  
determining when photographic function commences; and  
compressing the stored image data and storing the compressed image data when photographic function commences.



**[DRAWING ]**

[FIG.1]





[FIG. 2]

